



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/865,028	05/24/2001	Andrew M. Weiner	12818-003001	2898
26161	7590	06/01/2007		
FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER TRAN, DZUNG D	
			ART UNIT	PAPER NUMBER
			2613	
			MAIL DATE	DELIVERY MODE
			06/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/865,028

Applicant(s)

WEINER, ANDREW M.

Examiner

Dzung D. Tran

Art Unit

2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-24,49,70,73,74,77 and 80-83 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-24,49,70,73,74,77 and 80-83 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3-11, 17-19, 49 and 77 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent no. 6,327,068 to Silberberg et al. (hereinafter Silberberg).

Regarding claims 1 and 77, Silberberg discloses in figure 1, an optical processing system comprising: a dispersive element (14) positioned to receive the optical pulse 10 wherein the optical signal is distorted by the frequency dependent polarization effects that cause wavelength dependent changes in the state of polarization (SOP) of the optical signal (col. 9, lines 18-20) and spatially separate frequency components of the distorted optical signal on at least one spatial light modulator SLM 18 having multiple regions 20 with an independently adjustable polarization transfer matrix (Figure 1, Col. 5, lines 39-44), the SLM positioned to receive the spatially separated frequency components on the multiple regions and a controller (32) coupled to the SLM 18, wherein during operation the controller causes the SLM to

independently adjust the polarization transfer matrix of the multiple regions of the at least one SLM to reduce the distortion of optical signal by the frequency dependent polarization effect (col. 9, lines 18-27).

Regarding claims 3 and 4, Silberberg discloses the frequency-dependent polarization effects include polarization mode dispersion (PMD) effects and the polarization mode dispersion (PMD) effects can be represented by a frequency-dependent polarization transfer matrix characterized by a frequency-dependent differential delay and principle state of polarization (Figure 2A; Col. 9, lines 21-23).

Regarding claims 5-8, Silberberg discloses multiple signals on separate wavelength bands (i.e. WDM, abstract), includes at least one optical fiber (fiber that transmits optical pulse 10), recombining dispersive components 14, 15 the frequency-dependent polarization effects.

Regarding claim 9, Silberberg discloses the adjustments by the spatial light modulator are in response to the monitoring of the frequency-dependent polarization effects (e.g. spatial light modulator 18 is adjusted by a controller 32 (see Fig. 1).

Regarding claim 10, Silberberg discloses the spatial dispersion of the frequency components comprises a prism or grating (Col. 3, lines 55-57).

Regarding claim 11, Silberberg discloses the spatial light modulator comprises at least one liquid crystal layer (Col. 5, lines 22-24).

Regarding claims 17-19, Silberberg discloses an adjustment to phase (Col. 5, lines 42-43).

Regarding claim 49, Silberberg discloses using the SLM to selectively vary the intensity (Figure 2A; Col. 7, lines 24-27).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 12-16, 20-24, 70 and 73-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent no. 6,327,068 to Silberberg et al. in view U.S. Patent No. 5,719,650 to Wefers (hereinafter Wefers).

Regarding claims 12-16, Silberberg discloses all the limitations except for the spatial light modulator comprises at least two liquid crystal wherein the axis for one of the LC layers is different from the axis of another of the LC and the axes differ from one another by an absolute amount of about 45 degrees.

Wefers discloses the spatial light modulator (figures 1, 2) comprises at least two liquid crystal layers (col. 3, lines 44-45, col. 11, lines 11-12) or three liquid crystal layers (col. 12, lines 1-12) wherein the axis for one of the LC layers is different from the axis of another of the LC layers (e.g., first axis is disposed at 0 degree relative to polarization axis, second axis angled at about 42-48 degree relative to first axis and fourth axis is

axis angled at about 90 degree relative to polarization axis) and the axes differ from one another by an absolute amount of about 45 degrees (col. 4, lines 4-14).

At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the spatial light modulator of Silberberg to include at least two liquid crystal layers as taught by Wefers in the system of Silberberg. One of ordinary skill in the art would have been motivated to do this in order to reduce the cross-talk and noise interference between the wavelengths.

Regarding claim 20, Wefers discloses the adjustments to the polarization transfer matrix are selected to cause an adjustment to at least one of the phase, the state of polarization and amplitude of each of multiple subsets of the spatially dispersed frequency components (col. 1, lines 31-45, col. 5, lines 10-44).

Regarding claim 21, Wefers discloses the adjustments caused by the SLM at least partially pre-compensate (e.g., via a controller, col. 6, lines 26-28 and col. 7, lines 44-48) for the PMD.

Regarding claim 22, Wefers discloses the distortions comprise broadening of mean pulse duration (e.g., figure 7 A and col. 6, lines 64-67) in the optical signal, and wherein the adjustments reduce the broadening (e.g., figure 6 B and by pulse shaping, and col. 1, lines 22-63 or by adjusting phases and amplitudes of incident field) caused by the downstream optical system.

Regarding claims 23, 24 and 70, Wefers discloses the adjustments are selected to cause the state of polarization (SOP) of at least some of the frequency components to be substantially the same (i.e., since applying voltages via a controller to each pixel

can adjust the polarization for a component of the field (col. 4, lines 49-67), one could have been motivated to select an adjustment to cause the state of polarization (SOP) of at least some of the frequency components to be substantially the same) following transmission through the downstream optical system.

Regarding claims 73-74, Silberberg discloses the adjustments are selected to cause the phase of the at least some of the frequency components to be substantially the same (Col. 5, lines 42-43) and vary substantially linearly with frequency (e.g. by via filters which impart linear spectral phase sweeps on x and y polarized components (Figure 2A)

5. Claims 80-83 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent no. 6,327,068 to Silberberg et al. in view of Sharp et al. U.S. Patent no. 6,273,571.

Regarding claims 80 and 82, as per claim 1 above, Silberberg does not disclose a multiple spatial light modulators optically coupled to one another. Sharp disclose a multiple spatial light modulators 1024 optically coupled to one another (Fig. 3c; col. 11, lines 9-17).

At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to include the teaching of Sharp in the system of Silberberg. One of ordinary skill in the art would have been motivated to do this in order to detect the polarization of the multiple wavelengths. Thus it reduces the cross-talk and noise interference between the wavelengths.

Regarding claims 81 and 83, one skill in the art would understand that the multiple spatial light modulators optically coupled to one another over the light beam can be optically coupled to one another over the fiber.

Response to Argument

6. Applicant's arguments with respect to claims 1, 3-24, 49, 70, 73-74, 77, 80-83 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dzung D Tran whose telephone number is (571) 272-3025. The examiner can normally be reached on 9:00 AM - 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

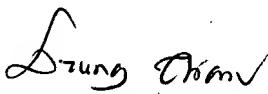
Application/Control Number: 09/865,028

Page 8

Art Unit: 2613

you have questions on access to the Private PAIR system, contact the Electronic
Business Center (EBC) at 866-217-9197 (toll-free).

Dzung Tran
05/26/2007


DZUNG TRAN
PRIMARY PATENT EXAMINER